

No Nonsense Nomenclature

Rules to naming chemical compounds

1. Ionic compounds

Ionic compounds are formed between a metal and non-metal.

In an ionic compound metals donate their electrons to the non-metal creating an electrostatic bond between the two elements that is very strong.

Naming ionic compounds.

The positively charged ion is written first (the metal).

The name of the metal remains unchanged.

The negative ion is written second.

The name of the negative ion is formed by adding the suffix *-ide* to the stem of the name of the element.

Examples:

NaCl: Sodium chloride

K₂O: Potassium oxide

MgBr₂: Magnesium bromide

CaS: Calcium Sulphide

Creating Chemical Formulas of Ionic Compounds.

To determine the correct molecular formula of a compound you must be able to determine the charge on each ion.

The charge can be determined using the periodic table.

Because chemical compounds are electrical neutral the charge on the positive ion must balance the charge on the negative ion. This is the **zero sum rule**.

Examples:

potassium bromide

sodium iodide

magnesium chloride

calcium bromide

calcium oxide

beryllium chloride

aluminum iodide

barium fluoride

2. Naming molecular compounds.

Molecular compounds form between two non-metals.

Molecular compounds share electrons to form covalent bonds. These bonds are not as strong as an ionic bond.

The element that is farthest left on the periodic table is written first.

The name of the first element remains unchanged and the stem of the second element takes on the suffix *ide*.

To indicate how many of each atom is in the formula we must use Greek prefixes.

one:

six:

two:

seven:

three:

eight:

four:

nine:

five:

ten:

Examples:

NO
SCl₂
HI

P₂S₅
PCl₃
CO₂

Chlorine dioxide
Dichlorine monoxide
Iodine tribromide

Nitrogen triiodide
Diphosphorus tetraoxide
Xenon hexafluoride

3. Naming Polyatomic Compounds

The key to naming these compounds is to identify the polyatomic ion.

Once again the name of the metal does not change, nor does the name of the polyatomic ion.

Examples:

KClO₃

NH₄I

Ba(BrO₃)₂

CuSO₃

(NH₄)₂CO₃

Sn(SO₄)₂

Calcium acetate

Aluminum hydroxide

Sodium phosphate

Calcium hydrogen carbonate

Ammonium phosphate

Lithium dichromate

4. Naming ionic compounds containing multivalent metals.

The rules remain the same for standard ionic compounds.

You must determine the charge on the metal.

Remember the zero sum rule.

Examples:

Fe₂O₃
Cr₂O₃
CuBr₂

SnO
NiCl₂
FeCl₃

mercury (II) oxide
copper (I) sulphate
gold (III) oxalate

cobalt (III) oxide
lead (IV) acetate
Iron (III) sulphide

Table 1.1 Common polyatomic ions

+1 ions	-1 ions	-2 ions	-3 ions
ammonium	cyanide	carbonate	arsenate
	acetate	oxalate	phosphate
	chlorate	chromate	
	bromate	dichromate	
	iodate	peroxide	
	nitrate	sulphate	
	cyanate	thiosulfate	
	hydroxide		
	thiocyanate		

Table 1.2 Nomenclature of Polyatomic Oxygen-Containing Ions

per	_____	ate	+1 oxygen
	_____	ate	
	_____	ite	-1 oxygen
hypo	_____	ite	-2 oxygen